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CONTENTS.

HENRY HERBERT LYMAN, M. A.

We have much pleasure in presenting to our readers, at the beginning of a new volume of the CANADIAN ENTOMOLOGIST, an excellent portrait of Mr. HENRY HERBERT LYMAN, of Montreal, who has recently retired from the Presidency of the Entomological Society of Ontario. He was born at Montreal, on the 21st of December, 1854, and received his early education at the West End Acadamy and the High School, winning at the latter the Davidson medal. At McGill University, to which he proceeded, he took the degree of B. A. (Logan medalist in Geology and Natural Sciences) in 1876, and M. A. in 1880.

In 1877 he entered the firm of Lymans, Clare & Co., wholesale druggists, in Montreal, which two years later assumed the present name of Lyman, Sons & Co. He is now senior partner and also president of the Lyman Bros. & Co. (Limited), Toronto. These business houses are widely known throughout the Dominion, and have always been distinguished for their upright dealing, energy and enterprise.

Mr. Lyman has also been an active member of the volunteer force; he joined the 5th Battalion, now the Royal Scots of Canada, in 1877, as an Ensign, and rose to be Major in 1885, with which rank he retired in 1891. He has further manifested his loyalty by becoming a Fellow of the Royal Colonial Institute, and a member of the Council of the British Empire League.

When less than eight years old he began to take an interest in insects, and to observe their ways, and when only twelve he started to form

a collection of Lepidoptera, which has now become one of the finest in Canada. His first printed observations on insects appeared in the 6th volume of this magazine (1874), and he has since contributed to seventeen of the succeeding volumes; he has also furnished useful and interesting papers to several of the Annual Reports of the Society. The value of his scientific work and attainments has been widely recognized. Since 1891 he has been a member of the Editing Committee of this magazine; in 1895 and '96 he was elected Vice-President of the Society, and in 1897 he became President. He held this highest place in the Society for two years, to the great satisfaction of the members, and retired at the last annual meeting. He is also a Vice-President of the Natural History Society of Montreal, and member of a number of Scientific Societies in the United States. For the last thirteen years he has been President of the Montreal Branch of the Entomological Society of Ontario, and has done more than anyone else to keep alive the enthusiasm of the members, and to encourage all who show any interest in the subject to persevere in the study. During all these years nearly all the monthly meetings have been held at his home, and the members have greatly enjoyed his generous hospitality.

Mr. Lyman is a notable example of what a busy man can do. Though engrossed all day long with the duties and cares of a very extensive business, which demands, more, perhaps, than any other, a close attention to innumerable details, he yet finds time not only for the pleasures of an energetic collector of insects, but also for the performance of much careful and conscientious scientific work. His published papers are valuable contributions to science, being always characterized by thorough accuracy of statement, and showing the results of painstaking and long-continued research.

NOTE ON DANAIS ARCHIPPUS, Fab.

On the 30th October last I found, on the grounds of the Central Experimental Farm, a chrysalis of Danais Archippus, Fab. This was attached to a twig of maple, about seven feet from the ground, and was quite green. When I had kept it in the office for two days it began to darken, and on the 4th November the butterfly emerged, but in a crippled condition. This occurrence is rather interesting, and the question arises, If the chrysalis had been allowed to remain on the tree, would it have given the butterfly this autumn or not until next spring? It would be interesting to know if any other person has observed the chrysalis of this butterfly so late in the season as the above, and with what results. Arthur Gibson, Central Experimental Farm, Ottawa.

DESCRIPTIONS OF THREE NEW SPECIES OF COCCIDÆ FROM BRAZIL.

BY ADOLPH HEMPEL, SAO PAULO, BRAZIL.

Subfamily Coccinæ.

Capulinia crateraformis, n. sp.

The ♀ makes a small crater-shaped gall in the bark of the limbs and twigs. This gall is about 1.5 mm. high, and consists of an outer circular ring from 1 mm. to 1.5 mm. in diameter, and a small cone within, which can readily be removed. The cavity inhabited by the insect is smooth and is lined with a white powder. The adult ♀ is small, oval in outline, pink, and is dusted with a white powdery secretion. Boiled in a solution of KOH it becomes colourless. Size, after boiling: length, .96 mm.; width, .73 mm.

Antennæ small, variable, usually of five joints, although joint 3 sometimes divides so that the antenna becomes six-jointed. Length, 97 micromillimetres. Approximate formula 31(24)5. Average length of joints in micromillimetres: (1), 27; (2), 13; (3), 35; (4), 13; (5), 9. The last joint bears a terminal brush of coarse hairs. First and second pairs of legs entirely wanting. Third pair of legs atrophied; without any visible articulations; and not ending in a claw. The legs are usually placed so near the posterior end of the body that half the length extends beyond the margin. Length, .177 mm. Rostrum large and well developed. Mentum apparently dimerous. Rostral loop long, coiled upon itself, and extending to the second pair of spiracles. The spiracles are chitinous and well developed, and from one to four small round spinnerets are grouped around each one. The derm is transversely wrinkled. The abdomen is segmented and ends in two short setæ. The genital aperture is guarded by four small spines. Around the margin of the body, and on the dorsal surface, there are scattered small spinelike hairs.

Male and larva not observed.

Hab.—Sao Joao d'El Rei, State of Minas Geraes, Brazil. On the limbs and twigs of *Eugenia jaboticaba*. Mr. Alvaro da Silveira collected this species, and writes that it causes much damage to this fruit tree. From a foot-note by Prof. T. D. A. Cockerell, in the "Journal of the New York Entomological Society," Vol. VI., Sept., 1898, pp. 174 and 175, it is apparent that this species also occcurs in the State of Sao Paulo. In speaking of *C. jaboticabæ*, Ihr., Prof. Cockerell says: "Dr. Noack has also sent me some specimens *in situ*, collected by Dr. Campos Novaes at

Itatiba, State of Sao Paulo, and I find they live in little crater-shaped galls. The females have the antennæ with 5 or 6 segments." It is quite evident that the species which Prof. Cockerell examined was not *C. jaboticabæ*, but *C. crateraformis*.

The species of *Capulinia* may be readily separated by the following tabulated characters. Unfortunately, I have no material of *C. Sallei*, and the characters here given are taken from Sign. and Townsend & Cockerell.

C. jaboticabæ.	*C. crateraformis.*	*C. Sallei.*
Length, 2.40 mm.	Length, .96 mm.	Length, 1.50 to 1.67 mm.
Antennæ of 4 to 5 joints.	Antennæ of 5 to 6 joints.	Antennæ a short tubercle.
Length of antennæ, 75 micromillimetres.	Length of antennæ, 97 micromillimetres.	
First and second pairs of legs entirely wanting.	First and second pairs of legs entirely wanting.	First and second pairs of legs represented by a sharp conical tubercle.
Last pair of legs articulated, and without a claw.	Last pair of legs not articulated and without a claw.	Last pair of legs not articulated, terminating in a claw.
Last pair of legs .302 mm. long.	Last pair of legs, .177 mm. long.	
Last pair of legs removed from the posterior margin.	Last pair of legs very near the posterior margin.	Last pair of legs removed from the posterior margin.
The female makes neither a gall nor a definite sac; the eggs being deposited in a fluffy mass of white cotton.	The female makes a small crater-shaped gall.	The female covers itself with a white cottony sac bearing a single long filament from the end.
18 to 35 spinnerets around each spiracle.	1 to 4 spinnerets around each spiracle.	
Hairs on margin and body long.	Hairs on margin and body short.	

Subfamily Lecaniinæ.

Lecanium Silveirai, n sp.

♀ sub-circular to oval in outline, light red in colour. Dorsum convex, shiny, with a slight longitudinal median ridge; derm hard, depressed around the anal plates, and covered with a very thin layer of waxy secretion. Anal cleft short, with the sides contiguous. Arising on the ventral surface and extending up each side, are two lines of white powdery secretion. When removed from its resting place, it leaves a round patch of thin white wax behind. The specimens examined were 5 mm. long, 3.5 mm. wide, and 2 mm. high. It is probable that these specimens were immature, as none contained eggs or larvæ.

Boiled in a solution of KOH, the derm becomes soft and transparent, being chitinized only around the anal plates. Antennæ and legs wanting. Rostrum large and well developed, situated between the first pair of spiracles. Rostral loop long, extending to the anal plates. Anal ring apparently with ten hairs. Anal plates small, with the lateral angle rounded, and the antero-lateral side longer than the postero-lateral. The margin has two horseshoe-shaped incisions on each side, opposite the spiracles, in which the derm is thickened and chitinized. The spiracles are situated very near to these incisions, and are connected with them by many small round spinnerets. The tracheæ are large and many-branched. Around the margin of the body there are 2 or 3 rows of small hairs, each one arising from a small tubercle. The entire derm on both surfaces is covered with numerous large, round, nipple-shaped glands. These are dark brown with a light centre. Interspersed among these glands are a few hairs, and numerous small slender filamentous glands.

Hab.—Sete Lagoas and Diamantina, State of Minas Geraes. On the roots of grapevines, where it causes much damage. The specimens were collected by Mr. Alvaro da Silveira, on the roots of the Isabel grape. Mr. Amandio Sobral and Dr. Compas da Paz have known a disease for several years which they attribute to this insect. This species is of special interest to agriculturists and economic entomologists; and will be difficult to combat, because of its subterraneous habits.

Lecanium obscurum, n. sp.

♀ scale of young and half-grown individuals, green; the scale becomes darker with age, and is black in the old specimens. Shape elliptical, dorsum convex rounded, shiny, with minute patches of waxy secretion; the derm is finely granular, and wrinkled at the sides. On the

ventral surface there are two converging white lines on each side. Anal cleft .94 mm. long; sides contiguous. The largest specimens are 4.5 mm. long, 3 mm. wide, and 2 mm. high.

Boiled in a solution of KOH, it colours the liquid greenish. The derm is chitinized and retains a dark colour. It is not reticulated, but pitted with minute round hyaline spots. Antennæ of seven joints, all of which, except joint 3, bear hairs. Length 350–361 mm. Approximate formula 423 (17) (56), or 472 (13) (56). The antennæ are variable, but in all the specimens examined, joint 4 was the longest and joints 5 and 6 the shortest. Length of joints in μ: (1), 49; (2), 58–62; (3), 49–62; (4), 80–89; (5), 22–29; (6), 27–29; (7), 49-62. Legs ordinary; the coxa of the first pair of legs, with a short apical hair and several short spines; trochanter with the long side convex and bearing a long hair; the articulation between the tibia and tarsus is indistinct; tarsus with a constriction near the middle; claw short; digitules twice the length of claw, large, of equal size, bulbous at base, and broad and flat at the end; tarsal digitules slender, with the ends slightly expanded. Length of joints of first pair of legs, in μ: coxa, 80; femur with trochanter, 200; tibia, 120; tarsus with claw, 111; tarsus without claw, 89. The tarsi of the other legs are not constricted. Mouth-parts well developed, placed just posterior of the first pair of legs. Rostral loop short, not extending to the second pair of legs. Anal ring with ten hairs. Anal plates small; the outer angle rounded, the two outer sides nearly equal, the postero-lateral side being convex and just a trifle shorter than the antero-lateral. Around the lateral margin there is a simple row of small hairs placed wide apart.

♂ scale small, plain, white, very frail, composed of 7 lateral and 2 dorsal plates. General shape elliptical, the posterior part slightly narrower than the anterior; dorsum convex. Length, 1.355 mm.; width, .830 mm. Found on the branches and on the under side of the leaves.

Larva, just hatched, yellowish green in colour, oval in outline, with the posterior end of the abdomen slightly acuminate and ending in two long setæ. Eyes dark brown. Margin of body serrated and bearing a few short hairs. There are two groups of stigmatal spines on each side, each composed of two very short and one long club-shaped spines. Antennæ six-jointed, joints 3 and 6 about equal in length. Legs ordinary; claw long, tip well curved and slightly notched; the two

digitules are of unequal size, one being small and fine, with the end but slightly expanded ; the other larger, with the end flat and widely expanded. Tarsal digitules also of unequal size, one being longer and thicker than the other. Rostral loop long, folded upon itself and extending to the anal plates. Length, .335 mm.

Hab.—Ypiranga, State of Sao Paulo. Abundant on branches of *Maytenus*, sp.

THE NEURATION OF ARGYNNIS.

BY A. RADCLIFFE GROTE, A. M., HILDESHEIM, GERMANY.

In my examination of the types indicated by Mr. Scudder I have been quite unable to separate *Acidalia niphe*, Scudd., Gen. 101, from the type of Argynnis. This latter type, *A. aglaia*, L., is characterized by the second radial branch of primaries running so close to the main vein, for a distance beyond the median cell, as to form a minute false accessory cell above the angle of the radius which the crossvein joins. Since this, as well as all other features, are repeated in the wing of *niphe*, I conclude the genus *Acidalia* of Hübner, as founded on this species, must be dropped. Another type, *Dryas paphia*, can hardly be retained as distinct from *Argynnis* from the neuration. The only difference is, that the second radial branch, in running propinquitous, leaves the main vein at somewhat before the point chosen in *aglaia* and *niphe*. Indubitably *paphia* is a species belonging to the same phylogenetic group, a trifle isolated. On the other hand, neither *Issoria lathonia* nor *Brenthis hecate* share the character of the appressed second radial branch of *Argynnis* and should be separated from this genus. The differences in the neuration between *Issoria* and *Brenthis* are very small and comparative ; in both the second radial branch is not appressed and leaves the main vein above the median cell before the point of juncture of the crossvein. The point of departure in *Issoria* is a little outwardly removed and the propinquity is so great that one can see that it requires but little to make the branch decumbent. *Issoria* differs further by the angulate papery wings and by the fact that the crossvein on hind wings is but a faint scar between second median branch and cubitus. In *Brenthis* the crossvein is as in *Argynnis*, a rather strong scar, and joins inferiorly the third median branch ; whereas in *Issoria* the point of juncture is opposite the first cubital branch. It is a small distinction, but it reveals the fact that in *Issoria* the breaking up of the median series has progressed further. A parallel difference, more widely expressed, separates the two series of the Satyrids.

I leave out of this series the generic types of *Melitæa*, which are more specialized by the entire disappearance of the crossvein between

second median branch and cubitus. This feature is shared by *Phyciodes*, which differs by its frailer wings. In all these types of the *Melitæa* series, the second radial branch has passed the point of juncture of the crossvein and arises from the radius at a point near where the appressed branch leaves the main vein in *Argynnis*. Thus the *Melitæa* series is more specialized than the *Argynnis* series, in which the second branch leaves the radius before the crossvein. The genera, except *Phyciodes*, separated by Mr. Scudder from *Melitæa*—*i. e.*, *Lemonias*, *Euphydryas*—are all invalid from the neuration and texture of the wing.

There remains to discuss the genus *Euptoieta*. This is a specialized type, as shown by the passage of the second radial branch beyond the cell and by the open cell of secondaries. It seems to lead to *Agraulis vanillæ*, *Colænis julia* and *Dione juno*, in which the first radial branch has followed suit and the "long-wing" butterfly type is assumed. I differ from authors in considering these as Nymphalid or Argynnid types and not as related to the Limnads (*Anosia menippe*, etc.), and the "long-wing" type of *Heliconius*, in which latter the residuary features of primaries are quite apparent and the cells on both wings are closed.

BUTTERFLY LISTS.—A puzzled correspondent, who has been collecting and studying the butterflies of his own region of country for a score of years, has begun the preparation of a catalogue. At the outset he finds himself confronted with the difficult question as to what order he shall adopt in the arrangement of families and genera. He writes as follows: "I learned the sequence of genera, etc., from Mr. W. H. Edwards' plan, but I notice that every later author makes a plan of his own as to which genus precedes or follows. Now, probably no two men would exactly agree as to the sequence of genera, etc., but ought not all to agree as closely as possibly, to avoid confusion, and not to place stumbling-blocks in the way of the learner?". . . . "Also, as to the division of one genus into several, there is a similar difficulty. For instance, Mr. Edwards' genus Pamphila contained over eighty species; Dr. Holland divides it into several genera, yet I doubt if any average Lepidopterist can separate the species according to Holland. Of what use, then, is the division, especially to a beginner? Simply, it is confusion." . . . . "We should have a law, written or unwritten, forbidding any change either in the alteration of old names, or the addition of new ones, without the approval of a committee of competent men."

Our correspondent will assuredly have a large number of sympathizers. Every entomologist groans over the incessant changes in nomenclature that are being made. Some, no doubt, are justifiable and necessary, but very many are not and have soon to give way to others. It is high time that an "Entomologists' Union" should be formed to settle such questions as these, as urged by Mr. Lyman in his Presidential address of 1898.

BIBLIOGRAPHY OF MASSACHUSETTS COCCIDÆ — SUPPLEMENTARY TO CONTRIBUTIONS TO THE KNOWLEDGE OF MASSACHUSETTS COCCIDÆ.

BY GEO. B. KING, LAWRENCE, MASS.

The object of the present list is to bring together all the published records found by me to treat of, or give any reference to, Coccids known to inhabit Massachusetts up to August, 1899. Since then others have appeared and will be published when sufficient material is collected.

Cockerell, Theo. D. A., 1893.—Insect Life, Vol. VI., p. 103, he lists *Pinnaspis pandani*, Comst., from Mass. under glass.

Cockerell, T. D. A., 1895.—Insect Life, Vol. VII., p. 43, is a note on *Chionaspis spartinæ*, Comst., found at Woods Holl, Mass.

Cockerell, T. D. A., 1896.—CANADIAN ENTOMOLOGIST, Vol. XXVIII., pp. 222–224, he describes as new sp. *Ripersia Kingii*, *R. lasii* and *R. flaveola*, from ant-nests in Mass.

Cockerell, T. D. A., 1897.—Science Gossip, Vol. III., n. s., pp. 239–241, notes on all the known ant-nest coccids, and *Dactylopius Kingii* is described from Mass.

Cockerell, T. D. A., 1897.—Part L. of Bul. U. S. Nat. Muse., No. 39, p. 5, mention is made of the success of the writer collecting ant-nest species of coccids in Mass.

Cockerell, T. D. A., 1897.—Bul. No. 6, Tec. Ser. U. S. Dep. Agr., Div. of Entom., Aspidiotus (Chrysomphalus) smilacis, Comst., is recorded from Massachusetts.

Cockerell, T. D. A., 1898.—Ann. and Mag. Nat. Hist., Vol. II., sr. 7, pp. 323 and 330, *Aspidiotus Fernaldi*, *Lecanium Kingii* and *Kermes Kingii* are described from Mass., with a note of the occurrence of *Eriococcus quercus*, Comst.; *E. azaleæ*, Comst., and *Kermes pubescens*, Boyne, in Mass.

Cockerell, T. D. A., 1898.—CANADIAN ENTOMOLOGIST, Vol. XXX., pp. 293–294, references are made to *Lecanium caryæ*, Fitch., and *L. corylifex*, Fitch., found in Mass.

Cockerell, T. D. A., and King, G. B., 1898.—CANADIAN ENTOMOLOGIST, Vol. XXX., p. 326, *Sphærococcus sylvestris*, new to America, is found in Mass.

Cockerell, T. D. A., and King, G. B., 1899.—Psyche, Vol. VIII., pp. 349–350, *Lecanium pallidior*, n. sp., is described, with notes on *Lecanium Fletcheri*, Ckll., from Mass.

Cooley, R. A., 1898.—CANADIAN ENTOMOLOGIST, Vol. XXX., p. 89, he cites *Chionaspis Lintneri*, Comst., found at Stoneham, Mass.

Cooley, R. A., 1898.—CANADIAN ENTOMOLOGIST, Vol. XXX., p. 232, *Diaspis amygdali*, Tryon, is found at Jamaica Plain, Mass.

Cooley, R. A.—Bul. No. 17, N. Sr., U. S. Dep. Agr., Div. of Entom., pp. 61-67, Pseudococcus aceris, Sign. (*Phenacoccus aceris*, Sign.); *Gossyparia ulmi*, Geoff.; *Aspidiotus Fernaldi*, Ckll.; *A. Forbesi*, Johnson; *A. ancylus*, Putn.; *A. perniciosus*, Comst., and *Diaspis amygdali*, Tryon, are recorded from Mass.; and on p. 23, Mr. Cooley speaks of finding *Pulvinaria innumerabilis*, Rathv., at Amherst, Mass.

Comstock, J. H., 1880–1.—U. S. Agr. Rpt., pp. 215, 225, 248, *Pinnaspis pandani*, Comst.; *Mytilaspis pomorum*, Bouché, and *Icerya Purchasi*, Mask., are cited from Mass.

Fernald, C. H., 1894.—Mass. Hatch Exp. Sta. Rpt. for 1894 is an account of the occurrence of *Orthezia insignis*, Dougl., found in the college greenhouse.

Fernald, C. H., 1895.—Bul. No. 4, Mass. Hatch Exp. Sta. Crop Rpt., Aug., 1895, p. 25. I have not seen this.

Fernald, C. H., 1895.—Mass. Agr. Rpt. for 1895, pp. 385-395, the San José Scale in Mass.; and in the same publication, Report of the Entomologist on the same insect, p. 43.

Fernald, C. H., 1896.—Mass. Agr. Rpt. for 1896, p. 86, The San José Scale in Mass.; and in the same publication, p. 44–5, the same scale is treated upon.

Fernald, C. H.—Mass. Agr. Rpt., 1897, pp. 156–162, a report on the San José Scale; and also in his Report as State Entomologist, p. 102, treats upon the same scale.

Harris, Thos. Wm., 1829.—The New England Farmer, Vol. VII., pp. 186–187. He gives an account of the following coccids in Mass.: *Coccus hesperidum, L. (Lecanium hesperidum*, L.), and *Coccus adonidum, L. (Dactylopius adonidum, L.)*.

Harris, T. W., 1829.—New England Farmer, Vol. VII., p. 289, gives a short account of *Coccus cryptogamus*, Dalman (*Chionaspis furfurus*, Fitch.), found in Mass.

Harris, T. W., 1841.—Insects Injurious to Vegetation in Mass., pp. 201–203. The following are said to occur in Mass.: *Coccus hesperidum*, L. (*Lecanium hesperidum*, L.); *Coccus adonidum*, L. (*Dactylopius*

adonidum, L.); *Coccus arborum linearis*, Schr. (*Mytilaspis linearis*, Mod.), and *Coccus cryptogamus* (*Chionaspis furfurus*, Fitch.).

Howard, L. O., 1894.—Year Book, U. S. Dep. Agr., p. 255. Among others he cites *Mytilaspis pomorum*, Bouché, and *Chionaspis furfurus*, Fitch., from Mass.

Howard, L. O., 1894.—Insect Life, Vol. VII., p. 5, *Chionaspis furfurus*, Fitch., is said to occur in Mass.

Howard, L. O., 1894.—Insect Life, Vol. VII., p. 236, in his treatise on the maple *Pseudococcus*, *P. aceris*, Sign., in America, he cites it from Mass., on maple at Jamaica Plain.

Howard, L. O., 1896.—Bul. No. 2, N. Sr. U. S. Dep. Agr., The History of San Jose Scale in America, *Aspidiotus perniciosus*, Comst., is cited in Mass.

Howard, L. O., 1896.—In a paper read before the Mass. Hortic. Soc., Feb., 1896, and published by Brookwell and Churchill, Boston, Mass., among others he speaks of *Aspidiotus perniciosus*, Comst.; *Mytilaspis pomorum*, Bouché; *Chionaspis furfurus*, Fitch., and *Aulacaspis rosæ*, Bouché, occurring in Mass.

Howard, L. O., 1898.—Bul. No. 17, N. Sr. U. S. Dep. Entom., p. 16, *Asterolecanium quercicola*, Bouché, is cited from Mass.

Hunter, S. J., 1899.—The Coccidæ of Kansas, II., contribution from the Entomological Laboratory, No. 66, 1899, p. 70. Lecanium Cockerelli, Hunter, is described, and said to have been found by Mr. G. B. King (of course from Massachusetts).

Kirkland, A. H., 1897. — Mass. Agr. Rpt., 1897, pp. 244–247, he treats on *Gossyparia ulmi*, Geoff., as injurious to American elms in Mass.

Kirkland, A. H., 1898. — Mass. Crop Rpt., pp. 24–38, is a lengthy treatise upon *Aspidiotus perniciosus*, Comst., in Mass.

King, Geo. B., and Cockerell, T. D. A., 1897.—CANADIAN ENTOMOLOGIST, Vol. XXIX., pp. 90–93, *Lecanopsis lineolatæ*, *Phenacoccus americanæ* and *Ripersia Blanchardii*, n., sp., are described from Mass.

King, G. B., and Cockerell, T. D. A., 1898.—Psyche, Vol. VIII., pp. 286–287, *Pulvinaria innumerabilis*, var. *tiliæ*, n. var., is described from Mass.

King, G. B., and Cockerell, T. D. A., 1898.—Ann. and Mag. of Nat. Hist., ser. 7, Vol. II., 1898, they describe *Kermes nivalis*, n. sp., from Lawrence, Mass.

King, G. B., and Tinsley, J. D., 1897.—Psyche, Vol. VIII., pp. 150–151, *Dactylopius claviger*, n. sp., is described from ant-nests in Mass.

King, G. B., and Tinsley, J. D., 1898.—Psyche, Vol. VIII., pp. 297–298, *Dactylopius Cockerelli*, n. sp., is described from Mass.

King, G. B., 1897.—Entomological News, Vol. VII., pp. 125–129, Aphides and Coccids associated with ants. Among others are mentioned *Ripersia Kingii*, *R. lasii*, and *R. flaveola*, Ckll., from Mass.

King, G. B., 1899.—Psyche, Vol. VIII., p. 312, *Ripersia lasii*, Ckll., is found infesting the roots of China Asters at Lawrence, Mass.

King, G. B., 1899.—Psyche, Vol. VIII., pp. 334–336, *Chionaspis furfurus*, var. *fulva*, is described, with notes on other species. Prof. Cockerell has called my attention to a very bad mistake in my citation of the localities of *Chionaspis furfurus*, Fitch. (See Psyche, Vol. VIII., p. 335, and the sixth line from the bottom. It should read North Carolina, and not Northern California.)

King, G. B., 1899.—Psyche, Vol. VIII., p. 350, *Aspidiotus hederæ*, Vall., and *Aulacaspis elegans*, Leon., are found in a greenhouse, imported from Bermuda.

King, G. B , 1899.—Canadian Entomologist, Vol. XXXI., 1899, Contribution to the Knowledge of Massachusetts Coccidæ, I., pp. 109–112.
do. .. .. II., pp. 139–143.
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Lounsbury, C. P., 1895.—The 32nd Ann. Rpt. of Mass. Agr. Coll. = Appendix =. This treats upon all known *Orthezia* to date, and cites *Orthezia insignis*, Dougl., from a greenhouse at Amherst, Mass.

Lounsbury, C. P., 1895.—Bul. No. 28, Hatch Exp. Sta., Mass. Agr. Col., p. 23 and 26, cites *Gossyparia ulmi*, Geoff., and *Orthezia insignis*, from Mass.

Marlatt, C. L., 1899.—Science for June, 1899, p. 835–837. The author criticises and doubts the validity of *Chionaspis furfurus*, var. *fulva*, King, from Massachusetts.

Packard, A. S., 1869.—Mass. Agr. Rpt., pp. 257–261. The following species are said to be common in Mass.: *Aspidiotus bromeliæ* (*Aulacaspis bromeliæ* Kerner); *Lecanium platycerii*, Pack. (now unrecognized); *Lecanium filicum*, Boisd., and *Coccus adonidum L.*, (*Dactylopius adonidum*, L.).

Packard, A. S., 1871.—American Naturalist, Vol. IV., p. 686, substantially the same as the above.

Packard, A. S., 1886–1890.—Fifth U. S. Rpt. Entom. Com., p. 537. It states that *Chionaspis furfurus*, Fitch., was described from Mass. on apple and pear.

Pergande, Thos., 1898.—Bul. No. 18, n. sr., p. 27, U. S. Dep. Agr.; in his description of *Lecanium nigrofasciatum*, he cites it from Boston, Springfield and Deerfield, Mass.

Parrott, P. J., 1899.—CANADIAN ENTOMOLOGIST, Vol. XXXI., p. 11, he describes *Aspidiotus Fernaldi*, var. *Cockerelli*, and states that *A. Fernaldi* is found on honey locust in Mass.

Parrott, P. J.,and Cockerell, T. D. A., 1899.—The Industrialist for March, 1899, p. 165, notes with formula of the antennæ of *Lecanium coffeæ*, from greenhouse at Lawrence, Massachusetts.

Parrott, P. J., and Cockerell, T. D. A., 1899.—The Industrialist for April, 1899, pp. 233–235. Important notes appear treating upon *Lecanium cynosbati*, Fitch.; *L. tarsale*, Sign.; *L. nigrofasciatum*, Perg.; *L. quercifex*, Fitch., and *L. Kingii*, Ckll., all from Mass.

Parrott, P. J., and Cockerell, T. D. A., 1899.—The Industrialist for May, 1899, pp. 276–277, mention is made of *Aspidiotus elegans*, Leon., and *A. Crawii*, Ckll., from Lawrence, Mass.

Riley, C. V., and Howard, L. O.—Insect Life, Vol. V., p. 51, is a note recording *Gossyparia ulmi*, Geoff., at Boston and Brighton, Mass.

Scudder, S. H., 1899.—Psyche, Vol. VIII., p. 299, *Ripersis lasii*, Ckll., is found infesting the roots of China Asters at Lawrence, Mass.

Tinsley, J. D., 1899.—CANADIAN ENTOMOLOGIST, Vol. XXXI., p. 45, in his contribution to Coccidology, II., *Dactylopius Kingii*, Ckll., is reduced to a synonym of *Dactylopius sorghiellus*, Forbes.

Tinsley, J. D., and King, G. B., 1899.—Entomological News, Vol. X., p. 37, they describe as new *Ripersia minima*, from Lawrence, Mass.

A NEW GENUS AND SPECIES OF PHYCITINÆ.

BY GEO. D. HULST, BROOKLYN, N. Y.

MONOPTILOTA, n. gen.—Palpi ascending, second article heavy, third short; maxillary palpi small; front broad, flattened, ocelli not discernible in undenuded specimens; antennæ of ♂, first joint much lengthened, swollen, followed by a decided, rather lengthened bend, hollowed on

the inside into a deep furrow or pocket its entire length, the edges scaled, becoming tufted on posterior edges outwardly; beyond sinus filiform; from beyond basal joint the antennæ are unipectinate, the pectinations one on each segment, filiform, being longest just beyond sinus, and these five or six times the diameter of the stem, each armed with straight parallel hairs on each side; end segments ciliate. Antennæ of ♀ filiform ciliate. Thorax and abdomen rather stout, the genital armature of ♂ prominent. Fore wings rather elongate, subtriangular, 11 veins, 4 and 5 separate, 6 from cell near angle, 8 on 7, 9 and 10 from cell. Hind wings broad, 8 veins, 2 near angle, 3 from angle separate from 4, 4 and 5 stemmed half their length, 6 separate from 7. Cell very short, not more than ¼ wing length. Legs as usual in the group, rather heavy.

A very peculiar genus, with *Ceara*, Rag., unique in the unipectinate antennæ of the ♂.

M. nubilella, n. sp.—Expands 21–23 mm. Palpi dark fuscous, lighter on inner side; front fuscous, much darker in front of eyes; in one specimen purplish in middle, antennæ fuscous; thorax fuscous, with purple tint more marked in front, and lightening into grayish behind; abdomen fuscous to light fuscous-gray, somewhat purplish on anterior segment. All the segments darker lined; fore wings dark fuscous, broadly shaded with blackish longitudinally on veins, and lightened with white scales on anterior half, and submarginally making these portions gray, with blackish dashes of ground colour, the gray being most decided on sub-basal and central anterior portions. Over the wings on the intervenular spaces is a purplish stain, more evident posteriorly; cross lines faint, whitish, the inner shown mostly by the heavier dark angulate, somewhat diffuse, blackish outer shading, the outer fine, rounded outwardly in middle, with indistinct dentate tendency; discal spots geminate, black; marginal line broken, black; fringe fuscous. Hind wings dark smooth fuscous, lighter basally and along inner margin, the lines darker. Beneath even smooth fuscous, the fore wings the darker; marginal line blackish.

Specimens from National Museum and Department of Agriculture, taken in Maryland, Florida and Alabama. The insect, which promises to be of considerable economic importance, will have its habits and history made known by the Department of Agriculture. The type number in National Museum collection is 4393.

METZNERIA LAPPELLA, L.—A CURIOUS LIFE-HISTORY.

BY REV. THOMAS W. FYLES, SOUTH QUEBEC.

In the beginning of September, 1898, I discovered, in the heads of burdock (*Lappa major*, Gærtn.), a curious larva, of which the following is a description :

Head bilobed, brown. Mouth organs large. A brown plate, marked longitudinally with a white line, on the second segment. Body rounded, much crinkled, of a fatty appearance, having a few white hairs along the sides. Anal segment small and protruding. The legs small and weak. The pro-legs seemingly atrophied into mere pseudopodia. Length of larva, two and a half lines.

On the approach of winter, the larva, having eaten out a convenient hollow in the closely-packed seeds, cemented its surroundings together, and then lined its cell with a flocculent white cocoon. In this it remained unchanged till the beginning of June, when it went into chrysalis.

The pupa was of elegant shape, amber-coloured—the head parts darkening into brown. The antennæ and legs were traceable through the skin. The length of the pupa was three lines. The moths appeared in the end of June and continued till August. They mated about the middle of July.

The dimensions of the perfect insects were as follows :

Expanse of wings (♂) 5½ lines, (♀) 9 lines. Length of body (♂) 2½ lines, (♀) 4 lines. Length of antennæ (♂) 2 lines, (♀) 3 lines.

The eyes of the moth were large and prominent, in colour they were a rich brown. The palpi were reflexed—the second joint was long and had long scales, and the terminal joint was pointed. The antennæ were filiform, prettily encircled with minute short bristles at the joints. The proboscis was long and coiled up watch-spring fashion. The body terminated with a tuft like a paint brush. The tibia in the hindmost pair of legs had two pairs of spurs ; that in the second pair of legs had but one pair.

The fore wings were of a pale sienna-brown, with a patch of darker brown extending along the costa and towards the inner margin for two-thirds of the length of the wing. There were three or four lines of darker scales towards the hind margin and following its curve. Some of the specimens had the three dots on the disk, spoken of by Stainton (*Man. of Bh. But. and Moths*, Vol. II., p. 348).

The hind wings were slate-coloured, and had long fringes of the same hue.

The eggs of the moth (obtained by pressure) were very minute, globular, smooth and white. They are dropped probably into the flower-head of the plant, for the most careful microscopical examination showed no opening made by a larva through the involucre.

On August 4th I found the newly-hatched larva biting into the side of one of the outer seeds. The seeds at this time were white and tender. The body of the larva was white, waxen and semi-translucent.

The insects were identified for me by Lord Walsingham and Mr. J. Hartley Durrant. To them also I am indebted for the correction of the generic name from *Parasia* to *Metzneria*, Zeller.

It may be asked, How was this European insect advanced to Canada? This probably is the correct answer: At Point Levi there is a quarantine station for cattle, and Old Country hay and straw are often landed with the cattle, and burs containing larvæ of the species have at some time been landed with the fodder. The burdock is plentiful on all our roads.

BOMBYX CUNEA, Dru.

The latest communication of the Rev. T. W. Fyles on this subject may be briefly corrected by the following synonymy:

Spilosoma, Steph.
prima, Slosson.
cunea, Fyles (nec. Drury).
congrua, Walk.
antigone, Strk.
Hyphantria, Harris.
cunea, Dru.
punctatissima, S. & A. (et al.)
var. budea, Hubn.
textor, Harr. (et al.)

There can be no manner of doubt of Drury's figure. It represents the spotted form of Hyphantria. The description of the abdomen, at the last resort, is conclusive. The only point in doubt, as Dr. Ottolengui says, is as to the possible specific distinctness of *cunea* and *budea*. But Mr. Lyman is at work upon this, and may be able to give us some results later on.

Harrison G. Dyar, Washington, D. C.

INSECT BITES AND THE EFFECTS THEREOF.

BY CHARLES P. LOUNSBURY, DEPT. OF AGRICULTURE, CAPE TOWN, S. AFRICA.

The letter from Dr. Behr, under the caption, "A Californian Tick," in the August issue of the CANADIAN ENTOMOLOGIST, bears on a subject becoming fraught with interest to many investigators engaged in public service. It is with the object of stating my crude ideas on the matter, that of serious and exceptional effects sometimes following insect bites, and of relating my experience with man-attacking ticks, that I contribute this note. First, I think that a distinction should be drawn between the sting or bite of insects (I use both "bite" and "insects" broadly) that seek their prey for food only, as mosquitoes, ticks, and bugs, and those whose attack is primarily and purposely to inflict injury, as centipedes, spiders, and many hymenopterous insects. It is with the former class only that I now concern myself.

There seems to be an object in all the intricate relationships between the various forms of life, and, in general, we have not far to seek in ascertaining the object of any severe injury to one form by another. Rarely, if at all, do we find an organism wantonly inflicting injuries that must act directly for its own destruction. A mosquito, a flea or a tick seeks an animal to supply itself with food; and injury beyond that necessarily caused in puncturing the skin and in stimulating the flow of blood from the tissues beneath appears to be unnatural and abnormal. This direct injury, unless immensely multiplied, is, I incline to believe, never of a serious nature to a man or any other animal in a normal state of health. For *Argas persicus* to inflict a bite which of itself proves fatal seems monstrous. The destruction of the life of a man would not benefit the tick, when all it requires is but a mere drop of blood; and, on the other hand, for its bite to prove fatal would soon bring the tick to the verge of eradication. The case is quite different with the insects that consume much of their host, as hymenopterous parasites for instance, for they utilize their host to the utmost whilst destroying it.

Reasoning thus, and influenced doubtless by recent discoveries in the transmission of certain diseases by the agency of insects, I have come to believe that the direct injury inflicted by any individual insect when seeking a temporary supply or food is very rarely of a serious nature to a host healthy in mind and body. When the number of parasites is immensely multiplied, serious consequences may follow, but then we approach the condition instanced in the case of hymenopterous parasites. Apparent

exceptions to this rule do exist, but for most that have occurred to me I believe there is a reasonable explanation. For example, a single tick may paralyse a sheep or cause serious lameness in a horse, but only because the tick has chanced to insert its rostrum into particular tissues; in these cases, I have known the removal of the tick to afford almost immediate and entire relief.

An idea of this sort is at most a theory, but much support for this one may be obtained by its satisfactory application. As to how it is that various disorders, often of a serious and even fatal character, are induced or rather follow the attack of particular insects, even in limited numbers, I can only express the opinion that the effects are due, not to the primary injury, but to the incidental transmission of an organism quite as foreign to the attacking parasite as to its host. Thanks to American investigations, scientific research has shown that the Texas Fever organism is transmitted by ticks. I have affirmed this discovery in South Africa, and can add that we have ticks innumerable and of the same species in non-fever districts as we have where the fever is most prevalent; and further, that ticks were known in the present fever areas long before the disease spread into the Colony. Major Bruce, by his labours in Zululand, has demonstrated that the bite of the notorious Tse-tse Fly is only fatal because of the incidental introduction of an infusorial parasite. Dr. Koch, I understand, is now connecting malarial fevers with mosquitoes in an analogous association. Ticks are the cause of sheep dying in Great Britain because they may transmit to their host the bacillus of Louping Ill. Other instances still might be cited, but these I think are sufficient to impress one with the fact that insects are often only unconscious agents, not principals, in causing serious consequences through their bites.

The simple bite of an insect varies in its effects with different subjects, but, as Dr. Behr remarks, the variations seem due to personal idiosyncrasy. A Kafir laborer, treading on an Acacia thorn, will simply grunt, and after withdrawing it from his foot will go on unconcernedly with his work, although it may have pierced his leather-like sole a full inch; a European would be brought to the verge of tears, and might think himself incapacitated for further work during the rest of the day. Just so a native is as little annoyed with head-lice as a dog is with fleas, and sleeps soundly in his squalid hut while bed-bugs carouse over his naked body. From the vermin-seasoned, unfeeling savage to the super-sensitive product of civili-

zation there are innumerable gradations, and hence some variations in the effect of simple insect bites.

Some variation is due to other factors. Bites may be followed with less pain if the insect is allowed to work undisturbed. As a child, I was taught not to slap mosquitoes until they were ready to depart, and my impression is that following this instruction has saved me suffering. Persons bitten by Argasids have told me the pain is always greater if they disturb their tormentors. I have not tested this assertion, but I know that the bite of Argasids left to finish their meal in peace is trifling in after-effects compared with that of Ixodids which have been disturbed by forcible removal; one must remove the latter class of ticks or suffer their presence a number of days. Even if one of the latter kind has not fully inserted its rostrum preparatory to feeding, the after-effects are relatively more painful. Again, the structure of a tick's rostrum is such that forcible removal of the body often leaves a portion of the organ imbedded in the flesh. Large and painful festers may be thus initiated, which, if not properly attended to, may lead to serious consequences. Further, tick bites may be made more painful by indiscreet scratching or by irritation from one's clothing. In May last, while absorbed in watching larval ticks on grass tops, I became covered with the little fellows. Many worked their way through my clothing and my body in places was soon stippled with attached ones. Instead of smearing these with oil and leaving them to detach themselves, a measure which prevents almost all further irritation, I simply scrubbed them off in my bath. The result was innumerable painful though minute festers on my ankles and back. One cannot easily reach his back between the shoulders, and there the inflammation and pain soon subsided; but for ten weeks my ankles, which came in for scratchings without number and were also in continual friction with my boots, remained painfully sore. Occasional injury beyond that incidental to the bite may be caused, I suspect, by the introduction of the organisms found in abscesses (such as *Streptococcus pyrogenes*). The attack of a certain cattle tick in this country is not uncommonly followed by the formation of an abscess, and it may be that in this case the tick or ticks had previously feasted about a similar sore; certain it is that many are often to be found clustered about great festers.

Dr. Behr, like myself, scouts the supposition that *Argas persicus* inflicts a fatal wound. He suggests that the fatality may be due to the coincident occurrence of malaria, and mentions that malarious fevers

are very common in the region where the tick is recorded to occur. He considers *A. persicus* a local tick, and hence has seemingly thought it indiscreet to couple the tick with the malady as a transmitter of the latter from person to person. But there is good ground for considering *A. persicus* a widespread creature. A fowl-attacking tick in India is referred to the species, and also one in Australia. From a comparison of specimens from these countries with specimens of *Argas americanus* from Texas and with the common fowl tick of South Africa, Claude Fuller (now Natal Entomologist) and myself concluded that all were of one and the same species; on referring South African material to A. D. Michael, the well-known English authority on the group, we were told that our ticks presented no differences to *A. persicus*, and, moreover, that *A. persicus* was probably nothing more than the European *A. reflexus*. The *A. columbæ* mentioned by Dr. Behr, it may be added, is given by Neumann as a synonym of *A. reflexus*. Thus the historical, man-killing tick of Persia appears to be now found on five continents. This is not at all remarkable, for a parasite common to many birds like this one is readily distributed. Two trustworthy correspondents of mine say they have been bittten by our South African *Argas*, but both scoff at the idea of serious consequences ever following the bite. To note the effect of the bite myself, I recently permitted a long-starved specimen to refresh itself from my arm. It remained on sixty-five minutes, and then, loosening its hold, crawled off. In this time it had distended itself fully. The wound took a fortnight to heal, but I scratched the scab off several times when not thinking; otherwise it might have healed in a shorter time. The swelling and inflammation were slight, as was also the usual exudation of serous matter. The annoyance was limited to an occasional trifling itch such as the presence of a flea at work occasions me.

Further evidence indicative of the disease-transmission theory is afforded by the circumstances surrounding another tick whose bite is considered serious to man in some parts. I refer to *Onithodoros Savignyi*, Audouin. This is an African species which mayhap be identical with the very one which prompted Dr. Behr's letter.* This tick, in common with mosquitoes and certain other flies, is credited with the spread of fever by

*Neumann in his monograph does not give extensive ground for separating *O. Savignyi* and *O. turicata*. In this country, natives are known to carry the tick unintentionally with their belongings from place to place. It might easily have been introduced into America with slaves in the last century or earlier, just as negroes, returning to Africa, are said to have introduced here the Jigger Flea *(Sarcopsylla penetrans)*; this latter insect continues to spread, and is now found as far south as Durban, Natal.

some of the native tribes in Rhodesia; and the Namaquas, near the Orange River mouth, who have a perfect dread of it, and who will not rest in situations they suspect to be infested, also believe that it induces serious illness. David Livingstone heard stories to the same effect from the Portuguese in East Africa, and in his "Travels in South Africa," page 383, he thus describes the effects of the bite, apparently as experienced by himself: "These are," he says, "a tingling sensation of pain and itching, which commences ascending the limb until the poison imbibed reaches the abdomen, where it soon causes violent vomiting and purging. Where these effects do not follow, as we found afterwards at Tete, fever sets in; and I was assured by intelligent Portuguese there that death has sometimes been the result of this fever."

Now this tick, commonly known as "tampan," is spread far and wide in South Africa, and I am told is exceedingly common in the huts of natives in some parts. In the dry north-west of this colony, everybody seems to be acquainted with it and its bite. It is frequent at the uitspans (that is, places to rest the transport animals), and hence travellers nearly all receive its attention. But in these parts little more is thought of its bite than that of the bed-bug; and to my predisposed mind it has occurred that all the stories of serious effects come from notorious fever districts. Somewhat more than nine months ago I was favored with a collection of specimens from a Transvaal correspondent. He obtained them from an outhouse on his farm which had become infested simultaneously with the arrival of a batch of Bechuana natives from their own country. These tampans have been kept in a glass tube, and their long fast has made little difference in their appearance. They lie motionless in the dry earth enclosed with them and patiently await a host. Until I read Dr. Behr's letter, now two months ago, I had not "screwed up" sufficient courage to let any of the repulsive creatures repast at my expense, but his remarks decided me. On September 8th, I fed one in the morning and one in the afternoon. Both were simply placed on my arm, and they attended to their wants without further invitation. Neither was restless, but immediately scratched a hole and began. One staid on an hour and the other two hours. There was no sensation of pain in either case, but an exudation of a transparent fluid was observed to collect beneath the body of the tick, and the evaporation of this appeared to be responsible for a slight sensation of cold or numbness; at times, too, there was a slight tickling. At the conclusion of the respective banquets, each

was fully distended with blood. When they left, there were slight inflamed spots about two millimetres in diameter, but no abrasions visible, so neatly had the operations been performed. The next day the spots were somewhat swollen, and on the next there was a slight exudation of serous matter. There was, however, no pain beyond an itch when I was tired and sleepy. On the night of the third day I was taken violently ill with purging, accompanied by profuse perspiration and weakness. For a short time I was happy in mind (though not in body) with the thought that the ticks had given me an up-country "fever," but to my disappointment no fever set in; indeed it was two or three hours before my temperature rose to anything like the normal, from which it had dropped nearly three degrees during the acute distress. The following day I consulted the Colonial Medical Officer, and our conclusion was that while the attack might possibly have been induced through the ticks, the odds were much in favour of ptomaine poisoning; the fact that I had partaken of shop-made sausage a few hours previous to the illness favoured the latter view. Therefore it was desirable to have a fresh test conducted, and as, if the trouble arose from the ticks, there was a possibility of my now being immune, I was not a favourable subject. The Chief Inspector of Sheep for the Colony, A. G. Davison, volunteered to accept the risk, and at once a tick was placed on his arm. In forty minutes its distension was complete and it relaxed its hold. On the next day, feeling stronger myself and too enthusiastic to decide the doubt to heed any danger, I applied another specimen to my own arm; this one was a mature female, and when it withdrew fifty minutes later it had swollen to ten millimetres in length by seven in breadth. The critical third night passed without mishap either to Mr. Davison or myself. Nearly two months have now elapsed, and still none of the looked-for symptoms have appeared; and I feel convinced that the sausage was responsible in the first instance. The wound on Mr. Davison's arm healed in ten days. All three on my arm took at least a fortnight, and the last nearer three weeks, but I am less robust than Mr. Davison. The swelling in no case was more than trifling, and the inflammation, also slight, lasted but three or four days. I carefully watched for a rise in temperature after the last bite, but none took place. All this detail is mentioned to show that the tick has had a fair trial, and has failed to maintain its evil reputation. But however much one may doubt native traditions, one cannot refuse to credit Livingstone's account; and therefore my opinion is strengthened that in some sections the tick is the

transmitter of fever germs. The creature is long-lived, and while it requires few meals, perhaps only one in each moult, it may take the different meals from different persons. Parties native or long resident in fever districts often become, in a measure, immunized to the disease; but tampans, from feeding on the blood of such parties, might derive organisms which, transferred to susceptible newcomers, would induce a serious attack of the complaint. Students may shake their heads over this, but the transmission of fever in this manner would not be one whit more remarkable than the transmission of Texas Fever in cattle through a similar agency. When studying the metamorphosis of a certain cattle tick recently, I unintentionally gave this disease to a cow located far from any infected area, stabled night and day, and fed entirely on dry forage. The case was diagnosed by the Colonial Veterinary Surgeon, the best authority in the country, so its determination admits of no doubt. But the strange part is that the ticks inducing the disease must have had it transmitted to them from the mother tick; this had been collected in a Texas Fever area *ten months before.*

To refer again to *Argas persicus*, the change in location of a settlement affording temporary relief to the Persians may be explained without considering the relief evidence of very local distribution of the pest. All is, the tick only becomes abundant where its food supply is located. It does not multiply rapidly, but takes its meals so infrequently that its round of life is an extended one; therefore, after a few years an abode may become teeming with them. If such a place be occupied after a long period of disuse, the occupant would draw a multitude of the creatures from their lurking places; the presence of a clean-skinned stranger among the dirty inhabitants might also bring out the enemy in unusual numbers. In the long interval between its meals, the tick secretes itself away from its host just as a bed-bug does. Therefore the removal of the inhabitants and their scanty belongings leaves all or nearly all of the pest behind, perhaps to take a year or several years to starve to death. If the people change their location simply to get away from their vermin, it is probable that they look over their chattels to see that none is carried to the new quarters, and thus for a while they may have complete relief.

The apparently local distribution of *O. Savignyi* in parts of South Africa may be explained as I explain that of *A. persicus.* In the northwest of this Colony, *O. Savignyi* has the name of occurring almost solely in the shade of the Cameel Doorn *(Acacia giraffæ).* No experienced

traveller to those parts, I am told, rests himself or his horses under that tree. Elsewhere in the north-west certain other vegetation is avoided by the knowing ones. Away from these plants, one may rest with little risk of attack, but beneath them he will generally soon find things altogether too lively for comfort. I have sought an explanation from travellers, and have this plausible one from a surveyor, who is also an observant naturalist: The Cameel Doorn is the most common tree in those sun-scorched, sandy parts, and offers almost the only available shade to horses and cattle. These animals therefore seek that tree, and there they are frequented by the tampan, which, it should be stated, attacks horses and cattle as freely as men. Certain other vegetation may shelter sheep and goats, but these are not found in all localities. My informant had never watched the small stock to notice if the tampan attacked it, having taken this for granted; but he had observed that it was only in small stock districts that it was necessary to avoid low bushes which afford shade as well as the higher Cameel Doorn. The inference is that there is a triangular association between shade, animals, and the tampan tick. That no tree or plant is necessary for the welfare of the tick is evidenced by the fact that in some parts of the country it takes up its abode in native huts. The thatched roof and basket-work wall of a hut gives them the necessary shelter. On the veldt, they usually appear from the sand. It is motion, not sound or scent, apparently, that attracts them, but this statement requires elaborate experimental confirmation.

In conclusion of these somewhat disjointed remarks, I trust that they, in conjunction with Dr. Behr's letter, will have influence in arousing more interest in the somewhat neglected subject of insect bites and their effects. There are many lines open for original research, and there is a distinctly economic phase to some. For instance, if it can be demonstrated that fowl ticks, and other poultry parasites that alternate periods of rest away from the host with their gormandizing, may and do communicate diseases, as seems likely, an important public service will have been rendered. That demonstration would have greater influence with the farmer in inducing him to wage effective war against the vermin than a score of bulletins describing the insects and suggesting remedies. In this Colony we are now striving to prove a connection between our worst sheep and goat disease and ticks; and if we succeed, as now seems probable, we anticipate an immense "boom" in tick destruction, and consequent improvement in stock of all kinds.

NOTES ON SPECIES OF THE TETTIGIAN GROUP OF ORTHOPTERA.

BY J. L. HANCOCK, CHICAGO.

An interesting addition to Orthopteran distribution in the West Indies is the finding by Mr. R. J. Crew of the species Neotettix quadri-undulatus, Redtenbacher, on the Island on Haiti.

Eight specimens, kindly presented to me, were taken around Port au Prince, and, as Mr. Crew informs me, were "swept from plants along the banks of a small stream." I have identified this species, which was first described by Brunner and Redtenbacher, 1892, from the Island of St. Vincent, West Indies, in "Proceedings of the Zoological Society of London," and an excellent figure is to be found on Plate xvi., fig. 10. Here it is recorded as a Tettix, but subsequent study has shown its closer approximation to Neotettix, Hancock. Species of the latter genus occur on the mainland of the southern United States and Mexico. The above species was recorded "numerous" on the Island of St. Vincent. Mr. H. H. Smith found it at Chateaubelais, also at the south end of the island, near the sea, under decaying leaves. Brunner, 1893, again records this species from the Island of Grenada, at Mount Gay Estate, Caliveny Estate, Balthazar, in "Orthoptera of the Island of Grenada," Proceedings Zoological Society of London.

From a series of Tettigidæ kindly furnished me from Mexico by Mr. O. W. Barrett, I am able to describe two new species of the genus Tettigidea, Scudder:

Tettigidea jalapa, sp. nov.

Rather large. Eyes prominent. Above fusco-ferruginous, dark fuscous over entire face and the sides, the last few segments at the end of the abdomen pale, legs pale throughout, the maxillary palpi a little depressed apically and very light, below the edges of prominent points and abdominal rings light. Body long, granulate. Vertex a little wider or subequally broad with an eye; nearly flat, hardly advanced in front of the eyes, widening posteriorly, the front border very little convexed, passing latterly into small rounded and somewhat elevated carinæ ending abruptly near the anterior inner border of the eye; on either side and just behind are the very small lobes situated about the middle inner margin of the eyes in small sunken fossæ; mid-carina rather thin, extending backwards only as far as the ending of the lateral carinæ, but very little elevated, in front insensibly coalescing with the frontal costa;

in profile the apex obtusely rounded angulate, the frontal costa depresso-convexed in front of the eyes and advanced in front of the eyes about one-fourth their width; below the face is moderately declined; as seen in front the frontal costa is strongly sulcate, the branches commencing near the apex in front are gradually divergent to the middle ocellus, where they are more than usually separated. Eyes very prominent and globose. Antennæ very slender, reddish, inserted a little above and in front of the anterior inferior border of the eyes. Pronotum anteriorly angulate, the sides substraight, posteriorly long and subulate; the apex acute, passing the posterior femora; dorsum smoothly granulate, with no longitudinal wrinkles, or scarcely a vestige of vein-like arrangement of the granules between the shoulders; median carina distinctly elevated, nearly straight or gradually arched a little higher between and a little in front of the shoulders; humeral angles very obtuse, surface of dorsum between them tectiform; the anterior carinæ are curved, becoming a little divergent posteriorly; the borders of the posterior angle of the lateral lobe nearly form a right angle, acute at the apex; the posterior margin is straight and vertical. The elytra are nearly smooth externally, with a short thick oblique pale line very near the apex. Femora normal, the anterior and middle femora somewhat slender; the posterior femora rather broad, the first article of the posterior tarsus equals the third in length; the pulvilli subrounded below, the third is little the longest.

Length: body, ♂, 12 mm., pronotum 13 mm., post. fem. 7 mm. The wings extend beyond the apical process of the pronotum one millimetre.

Locality: Jalapa, Vera Cruz, Mexico, 4000 ft. elevation. June, 1898. O. W. Barrett.

Tettigidea chichimeca australis, form. nov.

Body rather small, fuscous, above ferruginous obscurely clouded with fuscous; face below the eyes light, spreading laterally over the lower portion of lateral lobes, pale underneath the abdomen; femora light, obscurely clouded; tibia a little more distinctly striped with fuscous. Vertex scarcely narrower than an eye, obtusely angulate in front, a little produced in front of the eyes, the front margin formed of little lateral carinæ directed obliquely backwards and ending near the anterior inner angle of the eye, where the eye is a little conically elevated, feebly sulcate on each side longitudinally, the little lobes not very distinct, middle carinated, posteriorly extending only as far as the lateral carinæ, anteriorly coalescing with the shining frontal costa; in profile the vertex is obtusely

rounded, advanced in front of the eyes about one-third their breadth, the frontal costa convexed, the distance between the anterior margin of the frontal costa and that of the eyes widening considerably below; the face below imperceptibly continued and quite declined; the apex is strongly obtusely rounded. As seen in front, the frontal costa is sulcate rather deeply, commencing near the apex, the branches are from here to the middle ocellus sub-parallel, and not divergent as in *jalapa*. Pronotum with the dorsum anteriorly obtusely angulate, the sides a little convexed, posteriorly subulate acute, passing the hind femora; dorsum granulate, with an indistinct longitudinal wrinkle on either side running parallel with the humeral angles, otherwise scarcely rugose; median carina distinctly elevated, gradually but slightly arched between the shoulders, sloping to the front margin; anterior lateral carina near the front sub-straight and subdivergent posteriorly; humeral angles strongly sloping laterally, as seen in front obtuse, between the shoulders convexed, the median carina clouded with fuscous. Elytra almost smooth, dark externally, marked with a minute light oblique line near the apex. Wings extended beyond the apex of pronotum. Femora with the carinæ unchanged, the posterior femora quite large, the first and third articles of the posterior tarsi about equal in length, all the pulvilli of equal length.

Length: body, ♂, 9 mm., pronotum 9.5 mm., post. fem. 5.5 mm. Wings extending about one millimetre beyond the process of pronotum, making the total length 11 millimetres.

Locality: Cuernavaca Morelos, Mexico. May, 1898. O. W. Barrett.

This species is so closely related to Tettigidea chichimeca, Sauss., that I place it as a dimorphic form.

A NEW POPULAR NAME FOR CLISIOCAMPA DISSTRIA.

For many years this insect has been popularly known as "the forest tent-caterpillar." During the past two or three years it has attracted much attention in New Hampshire, Vermont, and New York, from its ravages in maple forests, city or village maple shade trees, and in many orchards. In orchards it has often worked with its near relative, the apple tent-caterpillar (*Clisiocampa americana*). Every one who critically observes the habits of these two species of caterpillars soon discovers that "the forest tent-caterpillar" is a very misleading name for *Clisiocampa disstria*, because its caterpillars never make a tent, while the apple tent-caterpillars always do. Several who have seriously discussed these insects recently have felt the necessity of a new popular name for *Clisiocampa disstria*. Professor C. M. Weed, of New Hampshire, when writing his recent excellent bulletin on the pest, asked me to suggest some

change in the name. But after considering such names as "the forest caterpillar," "the forest Clisiocampa," "the spotted forest caterpillar," "the maple Clisiocampa," I was unable to suggest any good substitute for the old name. Recently, however, while again cogitating on the subject, the name of "forest tent*less* caterpillar" suddenly appeared on the horizon of my thoughts. It seemed hardly the thing at first, but the more I thought of it the more appropriate it seemed. I brought the name before the Entomological Club, the Jugatæ, here at Cornell University, and all agreed it was a very apt and easy way to solve the problem. The name of "forest tentless caterpillar" retains all of the "old associations;" it is not a radical nor a difficult change to become accustomed to, and it expresses the characteristic difference between the habits of the caterpillar and those of the apple tent-caterpillar. I would therefore here propose that *Clisiocampa disstria* be properly known as the forest tentless caterpillar. Are there any serious objections to this name, or has anyone a better one to suggest? M. V. SLINGERLAND, Ithaca, N. Y.

MELANOPLUS DIFFERENTIALIS IN NEW JERSEY AND PENNSYLVANIA.

Professor J. B. Smith, of New Brunswick, N. J., first reported this grasshopper in this section, as occurring in cranberry bogs in New Jersey. In 1896 specimens were taken by Mr. W. H. Wensel, of Philadelphia, in Southern Philadelphia ("the Neck"); by Mr. S. T. Kemp, of Elizabeth, N. J., at Camden, N. J.; and by Mr. C. Fen Seiss, of Philadelphia, on August 26th, the latter on a window-sill in the centre of the city. Mr. Seiss has in his collection four specimens taken in 1897, on August 2nd, September 11th (two specimens), and November 6th—all from Philadelphia. The writer secured five specimens on September 5th and 11th at League Island and Philadelphia Neck, Philadelphia Co., Penn. They were collected on the large leaves of weeds, except one taken on a cement walk. In the same year specimens were taken at Riverton, Burlington Co., and Westville, Gloucester Co., N. J., by Mr. H. L. Vienck. In 1898 they first appeared mature about August 1st, in the streets, on lots, and even in the iron manufacturing sections of the city, where there is absolutely no vegetation. Their number was greatly increased, and they appeared to be firmly established. The year 1899 presented this species as a rather common grasshopper from August to October, with all the territory surrounding this city occupied by it. The range of this species this far east (Smith's record) was doubted by Scudder (Rev. Melan., p. 353), but he adds in a foot-note that he later noticed specimens in the collection of the American Entomological Society of Philadelphia from Camden Co., N. J. The range of this species to the north or south of this section I do not know, but I think it has come east to stay, as it seems to take possession of everything and thrive in its new location.

JAMES A. G. REHN, Acad. Nat. Sci., Philadelphia.

Mailed January 17th, 1900.